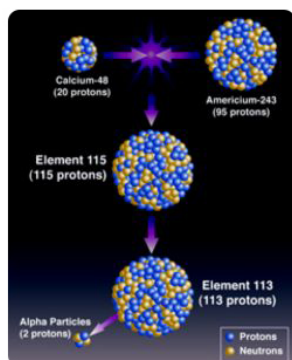


LIVERMORE LAB REPORT

A weekly review of scientific and technological achievements from Lawrence Livermore National Laboratory, Dec. 2-6, 2013.



WHAT 'UUP'



Lawrence Livermore is about to be credited adding another element to the periodic table.

Element 115 was first discovered in 2003 by Lawrence Livermore scientists in conjunction with researchers at the Joint Institute for Nuclear Research in Dubna, Russia. It goes by the name ununpentium (symbol Uup) because it has not been officially named. Its temporary name means one-one-five (its atomic number) in Latin.

Little is known about ununpentium other than it is a radioactive, synthetic element. It is classified as a metal and is expected to be solid at room temperature. It decays quickly into other elements, including ununtrium. To make ununpentium, the scientists in Russia and the United States bombarded atoms of americium with ions of calcium in a cyclotron. This produced four atoms of ununpentium.

The naming of element 115 is governed by the International Union of Pure and Applied Chemistry (IUPAC). Any discovery of new elements must first be confirmed by an independent laboratory and established beyond a reasonable doubt. Afterward, the research team that discovered the element is asked to propose a name and symbol for the element.

In 2012, Livermorium, element 116, was added to the periodic table.

To read more, go to [Live Science](#).

THE SECRETARY COMES TO TOWN



Energy Secretary Ernest Moniz leads a discussion at the Secretary of Energy Advisory Board (SEAB) meeting this week.

During the next several months, Secretary of Energy Advisory Board (SEAB) members will focus on the resilience of the nation's energy infrastructure in the face of risks, such as climate change, and physical and cyber security.

During a two-day visit, SEAB members met at Lawrence Livermore's High Performance Computing Innovation Center to discuss energy and national security issues on which they advise and make policy recommendations.

Energy Secretary Ernest Moniz said that the department has a new role based on President Obama's Climate Action Plan (CAP). "We have a risk of interdependency on different energy infrastructures," he said. As an example, he pointed to how the lack of electricity during superstorm Sandy affected the ability of residents to get fuel. "It's time to look at the bigger picture. We need to look at all our vulnerabilities in a unified way."



The world is on track to emit record levels of carbon dioxide this year, according to a new report.

The study, found that the world is set to emit nearly 40 billion tons (36 billion metric tons) of carbon dioxide by the end of 2013. The estimate represents a 2.1 percent increase over last year's emissions levels, and a 61 percent increase over 1990 levels.

"Energy growth in places where economic growth is strongest is being driven largely by fossil energy and, very largely, by coal," said A.J. Simon, an energy researcher at Lawrence Livermore, who was not involved in the study.

Some of those carbon emissions are outsourced from wealthier nations that have moved manufacturing centers to poorer countries. "That does raise the standard of living for a lot of the people who take those jobs, but it also absolutely pushes up the energy use in those countries," Simon said.

To read more, go to [Yahoo News](#).



The Sequoia supercomputer

IBM supercomputers have taken the top three spots on the latest Graph500 list released this year at the Supercomputing Conference (SC'13). The biannual list ranks high-performance computing systems on the basis of processing massive amounts of big data.

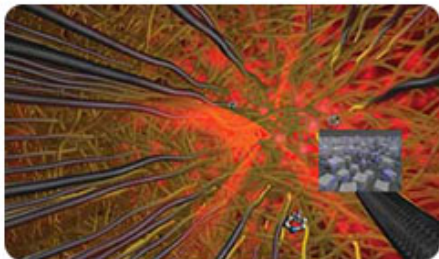
The top three positions have been awarded to Lawrence Livermore National Laboratory's Sequoia, Argonne National Laboratory's Mira and Forschungszentrum Juelich's (FZJ) JUQUEEN, which all use IBM Blue Gene/Q systems. Blue Gene supercomputers have ranked No. 1 on The Graph500 list since 2010 with Sequoia topping the list three consecutive times since 2012. IBM also was the top vendor on the most recent list, with 35 entries out of 160.

The Graph500 was established in 2010 by a group of 50 international HPC industry professionals, academics, experts and national laboratory staff. There are five key industries that the Graph500 tries to address with its benchmark which include cyber security, medical informatics, data enrichment, social networks and symbolic networks.

To read more, go to Yahoo Finance.



IT'S A JUNGLE OUT THERE



The high-sensitivity sensor is based on the curved tips of carbon nanotubes. The numerous gaps in the spaghetti like construction allow the Raman-scattered light to pass through. Photo

courtesy of H.G. Park, ETH Zurich.

Researchers from Lawrence Livermore and the Swiss Federal Institute of Technology have developed a new method of using jungles of nanotubes to detect molecules at extremely low concentrations enabling trace detection of biological threats, explosives and drugs.

The spaghetti-like arrays of gold-coated metallic carbon nanotubes can amplify the signals of surface-enhanced Raman spectroscopy (SERS) enough to perform analyses that are more reliable, sensitive and cost-effective.

SERS is a surface-sensitive technique that enhances the inelastic scattering of photons by molecules adsorbed on rough metal surfaces or by nanostructures.

The researchers hope their engineered material will eventually be used in portable devices to conduct on-site analysis of chemical impurities such as environmental pollutants or pharmaceutical residues in water.

To read more, go to [Photonics Spectra](#).

LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance. To send input to the *Livermore Lab Report*, send [e-mail](#)